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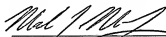
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in the following listed application(s) or patent(s) for which the issue fee has been paid.

<u>Patent No.</u>	<u>Serial No.</u>	<u>Patent Date</u>	<u>Filing Date</u>	<u>Confirmation No.</u>	<u>Attorney Docket No.</u>
7,750,159	10/579,114	07/06/2010	05/11/2006	1511	0553-0499

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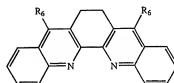


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(12) **United States Patent**
Nomura et al.(10) **Patent No.:** **US 7,750,159 B2**
(45) **Date of Patent:** **Jul. 6, 2010**(54) **PHENANTHROLINE DERIVATIVE AND
LIGHT EMITTING ELEMENT AND LIGHT
EMITTING DEVICE USING THE SAME**(75) **Inventors:** **Ryoji Nomura, Kanagawa (JP); Daisuke
Kumaki, Nigata (JP)**(73) **Assignee:** **Semiconductor Energy Laboratory
Co., Ltd. (JP)**(*) **Notice:** **Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 148 days.**(21) **Appl. No.:** **10/579,114**(22) **PCT Filed:** **Jun. 29, 2005**(86) **PCT No.:** **PCT/JP2005/012436**§ 371 (c)(1),
(2), (4) **Date:** **May 11, 2006**(87) **PCT Pub. No.:** **WO2006/004138****PCT Pub. Date:** **Jan. 12, 2006**(65) **Prior Publication Data**
US 2007/0145353 A1 Jun. 28, 2007(30) **Foreign Application Priority Data**
Jul. 7, 2004 (JP) 2004-200059(51) **Int. Cl.**
C07D 471/02 (2006.01)
H01L 51/50 (2006.01)(52) **U.S. CL. 546/49; 428/690; 428/917;
313/506**(58) **Field of Classification Search 546/49;
428/917, 690; 313/506**
See application file for complete search history.(56) **References Cited**
U.S. PATENT DOCUMENTS5,393,614 A 2/1995 Nakada 428/690
2004/0265626 A1 12/2004 Shibamura et al. 428/690**FOREIGN PATENT DOCUMENTS**EP 0 564 224 10/1993
EP 1 097 980 5/2001
JP 05-331459 12/1993
JP 2001-131174 5/2001
JP 2003-017268 1/2003
JP 2004-107263 4/2004
JP 2004-175691 6/2004
JP 2005-108720 4/2005
WO WO 2004/026870 4/2004**OTHER PUBLICATIONS****International Search Report re application No. PCT/JP2005/012436,
dated Aug. 30, 2005.**
**Written Opinion re application No. PCT/JP2005/012436, dated Aug.
30, 2005.****Primary Examiner—Charanjit S Aulakh****(74) Attorney, Agent, or Firm—Husch Blackwell Sanders
LLP**(57) **ABSTRACT**

It is an object of the present invention to provide a novel material that can be used for an electron injecting material. In addition, it is an object of the present invention to provide a light-emitting element that is able to broaden choices for an electrode material.

An aspect of the present invention is an electron injecting material represented by a general formula (2). In the general formula (2), R₆ is selected from the group consisting of an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 1 to 4 carbon atoms, and an aryl group having 6 to 10 carbon atoms, where the alkenyl group and the aryl group may have a substituent.



(2)

10 Claims, 12 Drawing Sheets